CLAIM AMENDMENTS

1. (currently amended) A device for need-controlled modulation of physiological and/or pathological neuronal rhythmic activity, the device comprising

a control unit,

at least one means for detecting brain activity and connected to the control unit, and

a stimulator for generating a periodic succession of pulses to control the phase dynamic of the neuronal rhythmic activity and a single desynchronization pulse following the periodic succession of pulses to desynchronize the neuronal rhythmic activity, the periodic succession of pulses and the single desynchronization pulse being visual or acoustic or tactile.

2. (previously presented) The device according to claim 1 wherein the stimulator is at least one component from the group comprising a display screen, a pair of shutter-equipped eyeglasses, a loud speaker, headphones, a pressure generator and a time-modulated laser.

3. (previously presented) The device according to claim 1 wherein the means for detecting brain activity is at least one component from the group comprised of a scalp EEG electrode or a MEG electrode.

4. (previously presented) The device according to claim 1 wherein the means for detecting brain activity is connected with the control unit via an isolating amplifier.

5. (previously presented) The device according to claim 1, further comprising

means connected to the control unit for feeding back a patient reaction.

6. (previously presented) The device according to claim 1, further comprising

means for evoking physiological and/or pathological brain activity.

7. (previously presented) The device according to claim 6, further comprising

means for carrying out a frequency scan.

8. (previously presented) The device according to claim 1, further comprising

means for quantifying the neuronal activity.

9. (previously presented) The device according to claim 8 wherein the means for quantifying the neuronal activity is a means for quantifying the amplitude of the power spectrum over the excitation frequency range or a means for quantifying the instantaneous amplitude of the frequency range as determined by the Hilbert transformation.

10. (previously presented) The device according to claim 1 wherein the control unit is connected with means for actuating the stimulator.

11. (previously presented) The device according to claim 1, further comprising

means for investigating the signals measured by the sensor.

12. (previously presented) The device according to claim 11 wherein the means for investigating the signals measured by the sensor carries out a Fourier transformation or a wavelet analysis.

13. (previously presented) The device according to claim 11, further comprising

means for registering the change in the amplitude of the rhythm to be excited.

14. (previously presented)]] The device according to claim 1, further comprising

means for carrying out an entrainment.

15. (previously presented) The device according to claim 1, further comprising

means for desynchronization.

16. (previously presented) The device according to claim 14, further comprising

means for testing the quality of the entrainment.

17. (previously presented) The device according to claim 16 wherein the means for testing the quality of the entrainment comprises means for determining the phase or the phase and the amplitude of the neuronal rhythm to be desynchronized.

18. (previously presented) The device according to claim 17 wherein the means for determining the phase and amplitude of the neuronal rhythm to be desynchronized carries out a Hilbert transformation or a matching of the signals of the neuronal rhythm with a slowly changing sine function in a sliding time window.

19. (previously presented) The device according to claim 1, further comprising

means for evaluating the phase and amplitude of the neuronal activity.

20. (previously presented) The device according to claim 19 wherein the means for evaluating the phase and amplitude of the neuronal rhythm contains means for calculating phase resetting curves.

21. (previously presented) The device according to claim 20, further comprising

means for visualization of the phase resetting curves.

22. (previously presented) The device according to claim 20, further comprising

means for the quantitative characterization of the phase resetting curves.

23. (previously presented) The device according to claim 19, wherein the means for determining the amplitude is a means by which the amplitude resetting curves are effected.

24. (previously presented) The device according to claim 1, further comprising

means for determining the vulnerable phase of the neuronal rhythm.

25. (previously presented) The device according to claim 24 wherein the means for determining the vulnerable phase is a means for varying the time spacing between the last excitation of the entrainment and the desynchronizing excitation signal.

26. (previously presented) The device according to claim 25 wherein the means for varying the time spacing between the last excitation of the entrainment and the desynchronizing is a means which effects a variation in the time spacing for different values of the intensity.

27. (previously presented) The device according to claim 25 wherein the means for varying the intensity is a means for increasing the intensity in equidistant steps.

28. (previously presented) The device according to claim 24, further comprising

means which enables from a series of test stimulations optimal stimulation parameters to be determined.

29. (previously presented) The device according to claim 28, further comprising

means which detects stimulation parameters from a series of test stimulations from which a minimization of the amplitude of the neuronal activity to be desynchronized can be obtained.

30. (previously presented) The device according to claim 29 wherein the means for determining the minimization of the amplitude of the stimulation parameters which give rise to a desynchronization of the rhythm comprises a means for carrying out the Hilbert transformation.

31. (previously presented) The device according to claim 29 wherein the means for determining the minimization of the amplitude of the stimulation parameters giving rise to a desynchronization of the rhythm comprises a means for matching a slowly changing sine function to a signal of the sensor in a time window following stimulation.

32. (previously presented) The device according to claim 29 wherein the means for determining the stimulation parameters giving rise to a minimization of the amplitude of the desynchronizing rhythm comprises a means for integrating the amplitude of the power spectrum over the frequency band of signals measured by the sensor in a time window following the stimulation.

33. (previously presented) The device according to claim 20, further comprising

means for increasing the intensity in non-equidistant steps.

34. (previously presented) The device according to claim 20, further comprising

means for evaluating phase resetting curves with which the effect of the desynchronizing excitation pulse on the phase dynamics of the desynchronizing neuronal activity is investigated.

35. (previously presented) The device according to claim 34 wherein the means for evaluating the phase resetting curves comprises a means for applying φ_a, the phase of the neuronal activity before stimulation, over φ_b, the phase of the neuronal activity after stimulation.

36. (previously presented) The device according to claim 34 wherein the means for evaluating the phase resetting curves comprises a means for determining the position of the phase resetting curve at which the transition from a main rise 1 to a main rise 0.

37. (previously presented) The device according to claim 1, further comprising

means for monitoring the stimulation.

38. (previously presented) The device according to claim 1 wherein the desynchronization pulse follows the periodic succession of pulses with a predetermined time delay.

39. (currently amended) A device for need-controlled ~~resynchronization~~ desynchronization of pathologically rhythmic brain activity of a patient, the device comprising:

a stimulator for generating visual, acoustic, or tactile pulses and applying them to the patient,

at least one sensor means for detecting brain activity of the patient, and

a control [[means]] unit connected to the stimulator and sensor means, the unit including [[for]]:

[[in a]] first [[mode]] control means for applying the pulses with the stimulator to the patient with a pulse frequency varying ~~across a broad range~~ between 1 Hz and 100 Hz while monitoring with the sensor means brain activity of the patient ~~until a narrow frequency range within the broad range is determined that~~ to determine a frequency range between 1 Hz and 100 Hz resonates with and excites brain activity in the patient, and

[[in a]] second [[mode]] control means for generating with the stimulator a series of the

pulses within the ~~narrow~~ determined frequency range followed after an interval by a single pulse and varying the length of the interval while monitoring with the sensor means brain activity of the patient to determine an interval at which the strongest desynchronization of pathologically rhythmic brain waves of the patient is effected.

40. The device according to claim 39 wherein [[in]] the second ~~mode the~~ control means also varies an intensity of the single pulses while monitoring with the sensor means brain activity of the patient to determine an intensity at which the strongest desynchronization of pathologically rhythmic brain waves is effected.

41. (currently amended) The device according to claim 40, wherein [[in]] the control unit further includes

a third ~~mode the~~ control means for controlling ~~controls~~ the stimulator such that the stimulator generates a succession of pulses having a frequency within the ~~narrow~~ determined frequency range and a single pulse of the determined intensity and following the periodic succession of pulses by the determined interval to desynchronize the pathologically rhythmic brain activity.

42. (new) A method of need-controlled desynchronization of pathologically rhythmic brain activity of a patient, the method comprising the steps of:

detecting brain activity of the patient;

applying a periodic succession of pulses to the patient to control the phase dynamic of the pathologically rhythmic brain activity; and

applying a single pulse to the patient following the periodic succession of pulses to desynchronize the pathologically rhythmic brain activity, the periodic succession of pulses and the single pulse being visual or acoustic or tactile.

43. (new) A method of need-controlled desynchronization of pathologically rhythmic brain activity of a patient, the method comprising the following steps:

applying visual, acoustic, or tactile pulses to the patient with a pulse frequency varying between 1 and 100 Hz while monitoring brain activity of the patient to determine a frequency range that resonates with and excites brain activity in the patient; and

generating a series of visual, acoustic, or tactile pulses having a frequency within the determined frequency range followed after an interval by a single visual, acoustic, or tactile pulse and varying the length of the interval while monitoring brain activity of the patient to determine an interval at which the

strongest desynchronization of pathologically rhythmic brain waves of the patient is effected,

44. (new) The method according to claim 43 wherein on generation of the pulses an intensity of the single pulses is also varied while monitoring brain activity of the patient to determine an intensity at which the strongest desynchronization of pathologically rhythmic brain waves is effected.

45. (new) The method according to claim 44, further comprising the step of:

generating a succession of visual, acoustic, or tactile pulses having a frequency within the determined frequency range and a single visual, acoustic, or tactile pulse of the determined intensity and following the periodic succession of pulses by the determined interval to desynchronize the pathologically rhythmic brain activity.